

# An Evaluation of SGOT among the Patient which Suffered from Thyroid Disorders

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Received: March 2019

Accepted: March 2019

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## ABSTRACT

**Background:** Alkaline phosphatase, ALP is found in all tissue of the body.<sup>[4]</sup> The enzyme responsible for extracellular catabolism of glutathione's is Gamma glutamyltransferase, GGT]. It is the main thiol intracellular antioxidant agent. The larger function of enzyme is to transport amino acid and peptide into the cell across the cell membrane in the form of gamma glutamyl peptidase. The only iodine containing amine hormones in the vertebrate are Triiodothyronine (T3) and thyroxine (T4). **Methods:** All samples were taken from hypothyroid, hyperthyroid and euthyroid subjects who fasted for at least 8 hours before the blood collection. Serum separated and analyzed for T3, T4, TSH, CK-NAC, CK-MB, LDH and AST(SGOT) . The sample was processed in standardized manner under set protocol in the Department of Biochemistry. **Results:** Among the total of 300 subjects of ages 25 -50 years of both sexes were included in the study, 100 were hypothyroid, 100 were hyperthyroid and 100 were euthyroid. Their serum levels of T3, T4 and TSH were estimated and confirmed. **Conclusion:** The present study might be beneficial in public health and clinical practice, as both thyroid disorders and cardiovascular diseases are important issue of concern to reduce the morbidity and mortality.

**Keywords:** Hypothyroid, Hyperthyroid, Euthyroid.

## INTRODUCTION

It is well known that the thyroid gland is one of the largest endocrine glands in the body. It produces thyroid hormones. This hormone is important at a cellular level, affecting the growth development and rate of function of many other systems in the body.<sup>[1]</sup> Heart beats gets faster and harder under influences of thyroid hormone. It also controls how quickly the body burns energy and makes proteins. This hormone is responsible for many functions of the liver.<sup>[2]</sup> World Health Organization reported that is the most prevalent yet easily preventable cause of brain damage. Worldwide, 740 million people are affected by iodine deficiency.<sup>[3]</sup> In addition, 30% of the world population is at risk of iodine deficiency related problems. There are number of risk factors for thyroid disease. These are genetics and heredity, personal or family, history of endocrine or autoimmune disease, infection, and exposure to

goitrogenic foods, certain drugs, particular chemical exposures, radiation exposure etc.

Alkaline phosphatase, ALP [EC 3.1.3.1] is found in all tissue of the body.<sup>[4]</sup> The enzyme responsible for extracellular catabolism of glutathione's is Gamma glutamyltransferase, GGT[ EC 2.3.2.3]. It is the main thiol intracellular antioxidant agent.<sup>[5]</sup> The larger function of enzyme is to transport amino acid and peptide into the cell across the cell membrane in the form of gamma glutamyl peptidase. The only iodine containing amine hormones in the vertebrate are Triiodothyronine (T3) and thyroxine (T4). These hormones are necessary for growth, development, and function of tissues. Apart from this, these hormones have great influence on oxygen consumption and metabolic rate of all cells including hepatocytes, thus alter hepatic function. Through conjugation, excretion, peripheral deiodination, the liver metabolizes thyroid hormones and in the synthesis of thyroid-binding globulin. Thus, it controls their endocrine effects.

Some contradictory results were found by studies, on the effect of hepatic dysfunction seen in liver diseases on thyroid function. It is also documented that chronic liver disease is related with low circulating T4 and its conversion to T3.<sup>[6]</sup> Though, some cases of hyperthyroidism in intrahepatic

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cholestatic patients were also reported. Few studies have documented the pathophysiological effect of hypothyroidism on liver function but no changes in liver enzymes in thyroid dysfunction (hypothyroid and hyperthyroid).

There are very few studies on the changes in liver enzymes in relation to hypothyroidism and hyperthyroidism. Therefore, the aim of present study is to investigate the activity of serum amylase, alkaline phosphatase and gamma glutamyltransferase in patients with thyroid diseases, hyperthyroidism and hypothyroidism. Apart from this, an attempt will be made to know the association of serum transaminases activities in aforesaid subjects.

## MATERIALS AND METHODS

### Study design

A cross comparative study among thyroid cases of serum SGOT level.

### Study setting

The place of study is a tertiary care hospital of a LPS institute of Cardiology, GSVM Medical College, KANPUR.

### Period of study

The duration of study was January 2016 to October 2016.

### Methodology

All samples were taken from hypothyroid, hyperthyroid and euthyroid subjects who fasted for at least 8 hours before the blood collection. 7 ml venous blood will be drawn from each subject & discharged into a plain sample bottle and allowed to clot. Sample is centrifuged at 3000 rpm for 15 min, serum separated from cells, and stored at 2-8°C in stoppered tubes for up to 48 hours. If longer storage is required, the sera or plasma is frozen at -25 ± 60°C. Serum separated and analyzed for T3, T4, TSH, CK-NAC, CK-MB, LDH and AST(SGOT). The sample was processed in standardized manner under set protocol in the Department of Biochemistry.

**Table 3: Distribution of cases according to age**

Group	Age Group	Hypothyroid Cases	Hyperthyroid Cases	Euthyroid Cases	Total
I	20-30	10	6	20	36
II	31-35	10	10	20	40
III	36-40	30	24	20	74
IV	41-45	36	26	20	82
V	46-50	14	34	20	68
Total		100	100	100	300

**Table 4: Distribution of cases according to parameters**

Parameters	Hypothyroid Cases	Hyperthyroid Cases	Euthyroid Cases	p value
T3 (ng/ml)	0.4 ± 0.2	2.4 ± 0.4	1.13 ± 0.37	<0.05
T4 (μg/dl)	3.2 ± 1.7	16.04 ± 2.92	8.63 ± 1.64	<0.05
TSH (μIU/dl)	26.04 ± 10.44	0.04 ± 0.06	3.02 ± 1.26	<0.05
SGOT(IU/L)	64.28 ± 10.56	52.08 ± 8.62	20.06 ± 8.62	<0.05

## DISCUSSION

This study consisted of 300 subjects. Out of 300 subjects, 100 were hypothyroid, 100 were hyperthyroid cases and 100 were euthyroid subjects.

### Inclusion criteria

- >25 years and < 50 years

### Exclusion criteria

- pregnancy
- hypertension and diabetes mellitus
- chronic renal disorders and liver disorders
- cardiac disorders
- dehydration

### Data Analysis

Data analysis done with the using Microsoft excel & ANOVA.

## RESULTS

Among the total of 300 subjects of ages 25 -50 years of both sexes were included in the study, 100 were hypothyroid, 100 were hyperthyroid and 100 were euthyroid. Their serum levels of T3, T4 and TSH were estimated and confirmed. The Mean ± SD of Serum AST/SGOT levels in hypothyroid, hyperthyroid and euthyroid subjects are 64.28 ± 10.56, 52.08 ± 8.62 and 20.06 ± 8.64 respectively. The statistical analysis is done by ANOVA. P-value is found to be <0.05, which is significant as shown below in [Table 4].

**Table 1: Distribution of cases according to gender**

Gender	No. Of cases	Percentage
Male	90	30%
Female	210	70%
Total	300	100%

**Table 2: Distribution of cases according to group**

Group	No. Of cases	Percentage
I	36	12%
II	40	13.4%
III	74	24.6%
IV	82	27.4%
V	68	26.6%
Total	300	100%

Thyroid hormones play an important role in differentiation, growth and metabolism. It has important tissue effects, which are classified into three major characteristics- first, general thermo genesis that is mediated by increase the basal metabolic rate, secondly, general metabolic effects that is mediated by stimulating protein and lipid turnover and carbohydrate metabolism, and lastly, the effects on growth and development.<sup>[7]</sup> Worldwide, Thyroid diseases are significantly the commonest endocrine disorders. It has been estimated that about 42 million people in India suffer from thyroid diseases.<sup>[8]</sup> In a population-based study, conducted in Cochin on 971 adult subjects, the prevalence of hypothyroidism was 3.9%. the prevalence of this disease in women, was higher (11.4%), compared to men (6.2%).<sup>[9]</sup>

In the present study, the number of females (210) were found to be more as compared to the males (90). 76 females and 24 males were associated with hypothyroid and 64 females and 36 males belonged to hyperthyroid cases. These results are similar to the previous studies. Saima Mustaq et al. (2014) also found the similar results, where 80% females and 20% males were included in the study.<sup>[10]</sup> The reason could be that estrogen might be involved in pathophysiology of thyroid dysfunction. Estradiol has an antagonistic effect on the hormones T3 and T4. The reason is estradiol participates with T3 and T4 for binding sites on the receptor proteins.<sup>[11]</sup> Hypothyroidism is characterized by low circulating thyroid hormones and raised TSH levels. The present study results showed that the Mean  $\pm$  SD of serum T3, T4 and TSH levels are  $0.4 \pm 0.2$ ,  $3.2 \pm 1.7$  and  $26.04 \pm 10.44$  respectively. These all differences are statistically significant ( $p < 0.05$ ). Previously, a few studies have investigated serum AST/SGOT activity in patients with thyroid dysfunction.<sup>[12,13]</sup> In this study, AST was studied as an indicator of numerous systemic disorders, due to their crucial role in the efficient functioning of body and maintaining its normal physiological activities. The Mean  $\pm$  SD of Serum AST levels in hypothyroid, hyperthyroid and euthyroid subjects is  $64.28 \pm 10.56$ ,  $52.08 \pm 8.62$  and  $20.06 \pm 8.64$  respectively. In a study Raju Pandey et al. (2013) assessed the Serum Enzymes Levels in patients with thyroid alteration. It is well known that thyroid hormones exert their effect on all tissue and modulate the rate of metabolic activity. Changes in thyroid function can affect the various organ system of body and perturb measures like AST, ALT, GGT, ALP, CPK and LDH. Both hypothyroidism and hyperthyroidism have potentially fatal systemic manifestations. Results of the present study revealed that there is a positive correlation between increased serum AST, ALT, GGT, CPK, ALP and LDH in hyperthyroidism and hypothyroidism.<sup>[14]</sup>

## CONCLUSION

In this study, personal information of the subjects was recorded in a form and overnight fasting venous blood samples were collected and analyzed. Results showed that there is a change of Serum SGOT levels in hypothyroid and hyperthyroid patient. This finding reveals that Serum SGOT levels are raised more in hypothyroid cases than hyperthyroid cases. Therefore, patients with hypothyroidism are at greater risk of developing systemic disorders. Though the multiple biochemical abnormalities in hypothyroidism and hyperthyroidism are well defined yet their underlying patho-physiology is not entirely understood. The present study might be beneficial in public health and clinical practice, as both thyroid disorders and cardiovascular diseases are important issue of concern to reduce the morbidity and mortality.

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**How to cite this article:** Verma S, Verma P, Jaiswal S, Anand BK, Marwaha MPS. An Evaluation of SGOT among the Patient which Suffered from Thyroid Disorders. Ann. Int. Med. Den. Res. 2019; 5(3):BC12-BC15.

**Source of Support:** Nil, **Conflict of Interest:** None declared